[illegible] Researchers are building nanomechanical computers modern-day versions of Babbage's "difference engine." [illegible]

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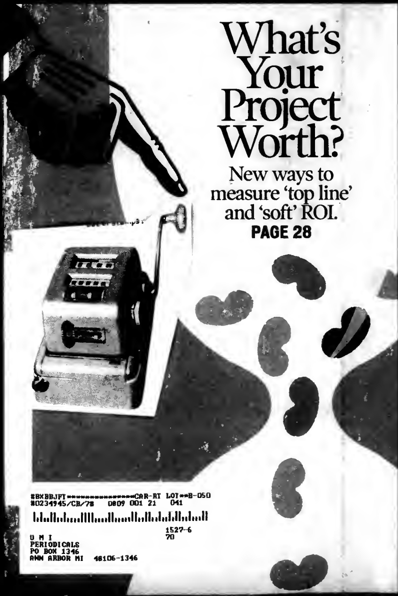

What's Your Project Worth?

New ways to measure 'top line' and 'soft' ROI.

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MARCH 10, 2008
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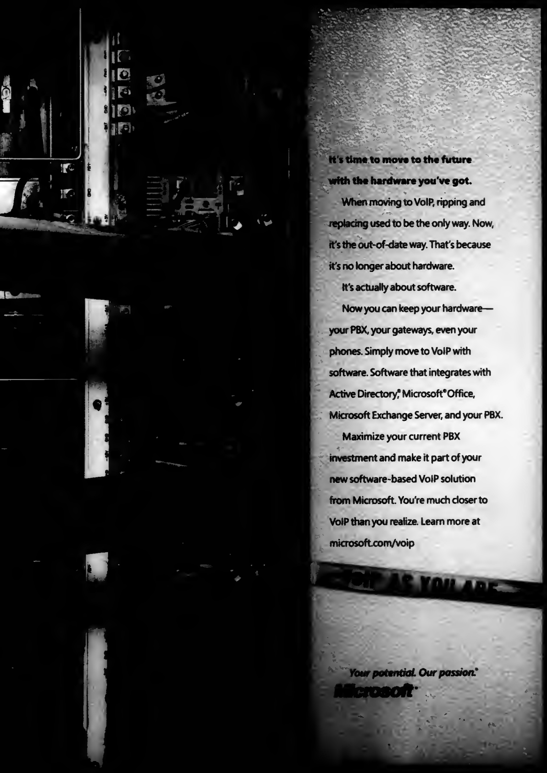

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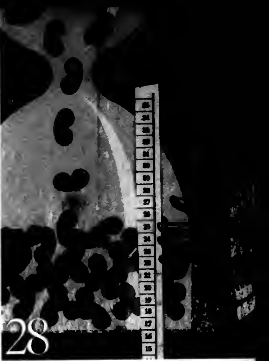

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COVER ILLUSTRATION PEP MONTSERRAT

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■ EDITOR'S NOTE

Don Tennant

Power Play

IT'S ONLY a matter of time. If you aren't doing what you need to do to reduce the carbon footprint of your data center by using less electricity, the U.S. government is going to take regulatory action to do it for you.

That's the conclusion I drew last week after taking part in the CIO Solutions Gallery summit on green computing, hosted by Ohio State's Fisher College of Business. The topic was raised during a discussion of the EPA's August 2007 report to Congress on server and data center energy efficiency, which found that as of 2006, data centers accounted for 1.5% of the electricity used in the U.S.

Key in the discussion were Donnie Foster, CEO of power management vendor Power Assure, and Bill Yeack, a former executive vice president at Exodus Communications, a now-defunct Internet hosting pioneer. They contended that the EPA report is flawed because the 1.5% figure was derived from an installed server base that the agency estimated to be 11 million — a figure they see as grossly understated.

Citing the report's acknowledgment that the estimate doesn't include custom-built servers used by big Internet companies like Google, Yeack claimed that the EPA's numbers "could be understated by as much as 4X." His contention was that the EPA was lowballing the numbers it was sending to Congress because the true figures might well have compelled Congress to enact regulatory legislation.

Yeack, who — along with representatives from a long list of IT vendors — provided input to the EPA when it was preparing the report, characterized the process as a "vendor food fight."

"Every vendor and their brother was in this report," he said, "trying to push the policy, the dialogue, in certain directions." That was no doubt the case. But Yeack's suggestion that the EPA and certain vendors were in cahoots to deceive Congress in order to avoid regulation is a stretch.

I contacted Andrew Fanara, the EPA official in charge of writing the report, and Jonathan Koomey, the scientist at Lawrence Berkeley National Laboratory upon whose research the report was largely based, to get their thoughts on Yeack's position. Both Fanara and Koomey stood by the numbers in the EPA report, and with good reason. As it turns out, those numbers are consistent with independent IDC estimates.

■ The suggestion that the EPA and certain vendors were in cahoots is a stretch.

On the matter of government regulation, Koomey declined to comment. But Fanara made it clear where the EPA stands.

"Regulation is probably not the best model for trying to encourage better use of energy in data centers or, more broadly, in IT in general," Fanara said. "The products and markets are very dynamic, change very quickly, and those characteristics make it difficult to apply long-term command-and-control sorts of regulations." He added that he doesn't think it's any secret that most companies would agree with him.

Stressing that he was expressing his own opinion rather than acting as a spokesman on government policy, Fanara said he thinks legislation aimed specifically at data center energy use is unlikely. But he indicated that he wouldn't be surprised to see broader legislation — something like an emissions tax — that would clearly have a substantial impact on data centers.

Of course, not everyone in the government sees data-center-specific regulation as all that unlikely. Back at the summit, Foster told me about a conversation he recently had with an official at the Department of Energy.

"I asked him, 'Why aren't you guys looking at regulation?' " Foster recounted. "He said, 'Right now, don't even talk about it. After the election, we will have some discussions.' He thinks there will be some changes after the election because he assumes the Democrats will come in, and at that point they'll be much more interested in trying to regulate."

Without government intervention, that 1.5% figure will double within a few years, because data center managers are doing next to nothing to curb electricity consumption on their own. Regardless of who wins the election or what form the legislation ultimately takes, regulation is going to happen. That's not necessarily a bad thing. But being unprepared for it is. ■

Don Tennant *is editorial director of* Computerworld *and* InfoWorld. *Contact him at don_tennant@computerworld.com, and visit his blog at* http://blogs.computerworld.com/tennant.

■ LETTERS

We're Not Sitting on the Bench, IT Pros Say

I have never read a Don Tennant column that made me as angry as "Entitled to Nothing" [Editor's Note, Feb. 4]. I am *not* sitting on the bench. I was let go from my last IT job five years ago, due to downsizing, and was released into the teeth of the IT downturn. I have a college education and experience in everything from mainframes to Web development. I can communicate very well — in fact, I do part-time sports radio work. I'm qualified, experienced, available and "sitting on the bench" because I can't get past the automated résumé programs to get in front of a human to sell myself. DeAndre Hodo's "qualified talent vs. talent" complaint is a smokescreen for "I don't want to pay them for their experience." There wouldn't be an IT shortage if companies would hire all of us IT guys who are "on the bench." They just don't want to pay the price!

■ **David Conley,** *IT specialist, McKinney, Texas*

Tennant's assessment is wrong. Only two people were quoted to build the argument that "truly talented people" are the ones in demand in the IT field. The reality is that IT managers are only interested in people with a proven track record of talent. I, and many others I know in the field, had incredible difficulty finding a first job after acquiring degrees and certifications. But now that we have some experience, we are regularly contacted by recruiters.

Regardless of what Lamoreaux or Hodo claim, the truth is that those of us who once found ourselves "sitting on the bench" but are now targeted by headhunters were talented all along; we just weren't considered talented until we had a few years of paid experience.

There are more certified IT workers than talented IT workers, but there are a lot of truly talented IT workers who just don't have the work experience necessary for a lot of IT managers to consider them. Until the number of businesses willing to consider IT professionals with less experience increases, the pool of "qualified" workers will continue to decrease.

■ **Brian Jarchow,** *Anacortes, Wash.*

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Facebook vs. LinkedIn: Which Is Better for Business?

We came up with six familiar business scenarios and asked two of our writers to examine them. One of them used Facebook; the other used LinkedIn. In some cases, it was clear which service could do the job better, but in others it was difficult – or impossible – to choose a winner.

Is Thinner Better? The ThinkPad X300 Challenges the MacBook Air

REVIEW: Lenovo's new ThinkPad X300 may not be as thin as Apple's MacBook Air, but it offers more features at a lower price.

Was Windows XP Microsoft's Last Good OS?

Considering the many problems Microsoft has had with Windows Vista, columnist Mike Elgan says the company needs to come up with an operating system that really works.

7 Secure USB Drives

REVIEW: We looked at everything from a drive that was built according to military specs to one that hides your Web searches.

Secrets of Rock Star Programmers

In this excerpt from a new book of interviews with successful software developers, Rod Johnson explains his conclusion that Java is better than C++, and he lists some characteristics of great programmers.

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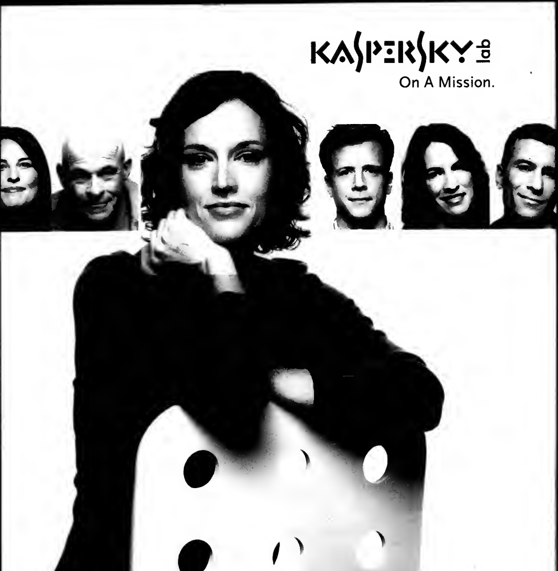
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News Digest

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THE WEEK AHEAD

MONDAY: *Computerworld*'s annual Premier 100 IT Leaders Conference starts in Orlando.

TUESDAY: Microsoft plans to issue four Office software updates, all rated "critical," as part of its monthly patch release.

WEDNESDAY: Microsoft Chairman Bill Gates will testify at a U.S. House hearing on innovation and U.S. competitiveness.

THURSDAY: A U.S. Senate panel will hold a hearing on whether agencies are doing enough to protect their IT systems.

MOBILE TECHNOLOGY

IT Execs Struggle to Control Wireless Costs

FOTOLIA

THE NEED to rein in cellular voice and data costs was cited as a top concern by several IT executives at the Mobile & Wireless Enterprise 2008 conference last week.

For example, Jim Swartz, Sybase Inc.'s CIO, reluctantly recounted the time when an engineer at the IT vendor rang up a $7,000 monthly cell phone bill after taking a business trip overseas. The steep tab caught the attention of senior management and led to an examination of how to keep wireless costs under control, Swartz said.

Ironically, Sybase itself sells mobile messaging, database and middleware products. Nonetheless, Swartz said it's difficult to manage wireless costs. "None of this is easy," he said, noting that the company has to deal with 27 different wireless carriers, including three in the U.S.

Some Sybase employees who travel abroad carry several SIM cards, each based on the rate plan in a different country, that they can swap in and out of their cell phones, Swartz said. But that's an inconvenience, he added. To try to make it easier on workers, the company now has a supply of loaner phones in various countries.

Tim Stanley, CIO at Harrah's Entertainment Inc., said that managing cellular costs also has been "a real bear" for the Las Vegas-based company, which has about 50 gaming locations internationally. "It's just a real mess out there, and we're spending a lot of money," Stanley said.

More than 75% of large companies don't have comprehensive programs for managing wireless devices and containing cellular costs, estimated Ronald Gruia, an analyst at consulting firm Frost & Sullivan Inc., which held last week's conference in Indian Wells, Calif.

Gruia said that about half of the companies surveyed on wireless issues by Frost & Sullivan even allow end users to pick their own cellular service providers.

Eileen Bridges, senior vice president of strategic planning and technical architecture at Bank of America Corp., cited yet another potential cost concern: "green" buildings with energy-efficient windows that can block cellular signals.

Bank of America is having problems at three buildings in Charlotte, N.C., Bridges said, adding that the interference has been linked to a material used in the glass manufacturing process.

Because of the problems, Bridges said, the bank has had to pay extra money to its wireless carriers to install equipment inside the buildings that can help enhance the indoor reach of the cellular signals.

— Matt Hamblen

Microsoft Corp. still has its sights set on acquiring Yahoo Inc. But Yahoo continues to play hard to get, and Microsoft CEO Steve Ballmer wouldn't comment last week on whether he plans to pursue a proxy fight to replace Yahoo's board.

"We still think the deal makes sense," Ballmer said after giving a speech at the CeBIT trade show in Germany. "We hope over time that it becomes a reality."

Ballmer said that there has been "a range of dialogue" between Microsoft and Yahoo officials since the software vendor launched its buyout bid on Feb. 1.

But on Wednesday, Yahoo indefinitely extended a March 14 deadline for nominating directors to its board. That move could discourage Microsoft from launching a proxy fight – and give Yahoo more time to consider its options.

– JEREMY KIRK AND JUAN CARLOS PEREZ, IDG NEWS SERVICE

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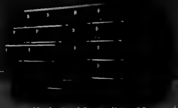

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SOFTWARE

Meeting on Proposed Open XML Standard Ends in Acrimony

MEMBERS OF the ISO standards body approved about 1,100 changes to a proposed Office Open XML standard during a weeklong meeting in Geneva late last month.

But most of the changes were voted on as a bloc, without any discussion. That left some participants and Open XML opponents critical of the voting process. Some also said it's unclear whether there's a consensus within ISO to actually ratify Microsoft Corp.'s file format as an open standard.

"Eighty percent of the changes weren't discussed," said Frank Farance, an IT consultant who led the U.S. delegation to the ballot resolution meeting. "It's like if you had a massive software project and 80% of it wasn't run through [quality assurance]. I've never seen anything like it, and I've been doing this for 25 years."

"People here are disgusted," said Andrew Updegrove, a technology attorney and an outspoken critic of Open XML who was in Geneva but didn't take part in the meeting. "The absurdity of trying to [ratify Open XML] by a 'fast track' process became quite apparent."

But ISO officials defended the voting process. Last Monday, Alex Brown, who in ISO parlance was the meeting's convener, wrote in a response to a blog post by Updegrove that the procedures were "fully in accord" with ISO directives.

Brown, who is a technical director at a company in the U.K., said that many of the changes were minor and that they were grouped together for voting because of time constraints.

Tom Robertson, general manager of interoperability and standards at Microsoft, said there was "a pretty rigorous review" of the issues that mattered most to the people at the meeting. "Not every issue that was raised needed to be discussed face to face," Robertson said.

Open XML won a majority of the votes cast in an initial round of ISO balloting last summer, but not enough to be ratified. A second round of voting started after the meeting and is scheduled to end March 29.

— *Eric Lai*

> **Eighty percent of the changes weren't discussed. I've never seen anything like it, and I've been doing this for 25 years.**
>
> [illegible]

> **I think the process has worked. Not every issue that was raised needed to be discussed face to face.**
>
> GENERAL MAN[illegible] INTEROPERABI[illegible] STANDARDS, MICROSOFT

Short Takes

[illegible] is set this week to defend itself against European Commission charges that it handed out "substantial rebates" to computer manufacturers for buying its x86 processors. Intel faces fines of up to $3.2 billion.

[illegible] has licensed protocols from rival [illegible] to add Exchange support to the iPhone. Apple also added a software development kit for installing non-Apple applications on the device.

[illegible] and [illegible] settled a two-year-old patent lawsuit a week before the case was to be heard in Texas. Visto charged that Microsoft used its patented technology for pushing e-mail to wireless devices in Windows Mobile. Terms weren't disclosed.

[illegible] has rejected a hostile $3 billion bid by [illegible] to buy the maker of electronic voting machines. Diebold Chairman John Lauer said the bid "significantly undervalues the company."

HARDWARE

Robots Deliver ROI To N.C. Hospital

« The Tug robot pulls a cart of medical supplies.

FIVE ROBOTS are tracking medical equipment, delivering drugs and significantly cutting costs at FirstHealth Moore Regional Hospital.

The Aethon Inc. robots use Tug automated courier and Homer RFID-based asset management technology. They are credited with saving the Pinehurst, N.C., facility at least $150,000 so far, said Dave Dillehunt, CIO at FirstHealth of the Carolinas Inc., which runs the hospital.

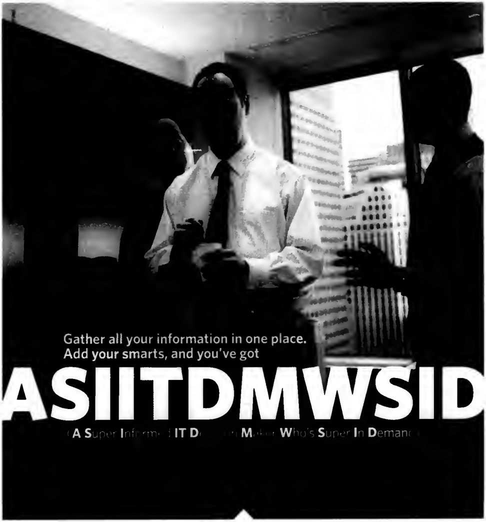
The Homer RFID technology, installed last summer, has allowed the hospital to cut its inventory of some expensive devices, since they can now be located more quickly. For example, the hospital now leases 450 infusion pumps, 250 fewer than before.

No workers have been replaced by the robots; four who made deliveries in the facility were retrained for other jobs. "There was staff concern initially," Dillehunt acknowledged, "but [the robots have] actually freed [them] up for other things."

The technology, priced at $1,800 per month per robot, uses Cisco networking, VPN and wireless products, according to Pittsburgh-based Aethon.

Jackie Fenn, a Gartner Inc. analyst, noted, "There is strong potential for mobile robots to [not only] perform specific tasks, such as delivery or cleaning, but also to deliver 'mobile infrastructure,'" like RFID technology, "on an as-needed basis."

– MATT HAMBLEN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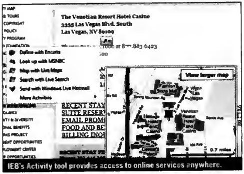
■ NEWS DIGEST



IE8's Activity tool provides access to online services anywhere.

INTERNET

Microsoft Shifts IE8 Standards Strategy

IN AN about-face, Microsoft Corp. last week said its Internet Explorer 8 browser will default to a standards-compliant method of displaying Web pages, rather than to IE's existing proprietary mode.

The company announced the move a day before it unveiled IE8 and posted links to the browser's first beta release. In January, it had said the standards mode would be an option in IE8.

The stronger support for World Wide Web Consortium specifications and other standards should make it easier to create Web pages that render properly on IE8, Firefox, Safari and other browsers, without extensive recoding.

Microsoft officials said the move to support standards by default is part of an effort to stress Web standards over backward compatibility.

"The Web gets better when developers spend less time on interoperability [problems] and more time innovating," Dean Hachamovitch, general manager of Microsoft's IE group, said during the company's Mix08 show last week in Las Vegas. "Long term, this is the right thing for the Web."

Aaron Gustafson, founder of Web consultancy Easy Designs LLC, said in a blog post that IE8 "(and the Web at large) is better for it."

— Eric Lai and Gregg Keizer

BETWEEN THE LINES *By John Klossner*

"THE ROBOT NURSES AREN'T SO BAD. IT'S THE ROBOT PROCTOLOGIST THAT SCARES ME."

The number of registered

topped at the end of last year, according to a report by which operates the global .com and .net registries.

demonstrated its first 45-nanometer processors at the CeBIT trade show. Rival began shipping 45nm chips last fall.

Research In Motion Ltd. agreed to pay $612.5 million to NTP Inc. to settle a patent dispute that had threatened to shut down RIM's BlackBerry e-mail service.

Global Dispatches

Yahoo Plans New R&D Lab in India

BANGALORE, INDIA – Yahoo Inc. last week announced plans to open a new research and development laboratory here that will focus on long-term projects.

The new R&D operation will be headed by Rajeev Rastogi, who was previously executive director of Bell Labs India, which is also in Bangalore.

Yahoo will retain its existing lab in Bangalore, where engineers focus on generating new product ideas and conducting engineering research, according to the company.

The Internet company said the new facility, which will be called Yahoo Labs Bangalore, will be a center of excellence whose projects will include work on next-generation search and advertising technologies.

Yahoo didn't say how many engineers will work at the new lab or when it will open.

John Ribeiro,
IDG News Service

Baidu.com Readies New IM service

BEIJING – Baidu.com Inc., creator of the most popular search engine in China, late last month announced plans to offer an instant-messaging service called Baidu Hi.

Baidu, which is based here, said the service has been in development for a year and is now undergoing internal tests. The company did not say when the service will be generally available or whether it will permit audio communications via VoIP technology.

The instant messaging business in China is currently dominated by Tencent Technology Co. in Shenzhen, which runs the QQ IM service.

Sumner Lemon,
IDG News Service

BRIEFLY NOTED

The European Commission last week gave the go-ahead to IBM's planned $745 million (U.S.) takeover of Malmö, Sweden-based Telelogic AB. The EC concluded that despite considerable overlap in the two companies' businesses, the deal would not lead to unfair competition.

Paul Meller,
IDG News Service

Fujitsu recommends Windows Vista® Business.
Fujitsu recommends Windows Vista® Home Premium.

Small wonder.

Family of Notebooks

U800 Ultra-Mobile PC

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intel Centrino inside

Core 2 Duo inside

Online Video Expands Role In Training, Collaboration

Some companies are taking advantage of technology that's banned from many corporate desktops. **By Heather Havenstein**

WHILE SOME companies are struggling to keep employees from watching online YouTube videos in the office, others are turning to video technology to improve internal training and collaboration, and to expand external marketing programs.

One approach is for businesses to post internally created videos on YouTube and other social networking sites to market themselves and their wares.

But some companies, like Philadelphia-based Rohm and Haas Co., are making a bigger investment. The manufacturer of specialty chemicals, construction materials and other products later this month will launch what it calls a "corporate YouTube" site for its 15,000 employees around the world.

Rohm and Haas officials said the company's internal site will be used to provide workers with access to training videos and information about a wide variety of topics supplied by their peers.

Charles Wallace, chief technical architect and IT director for global architecture and infrastructure at Rohm and Haas, said that a searchable library of online videos supports the natural tendency of workers to "bypass the knowledge base and go to their next-door neighbor [at work] or to the employees who know" to get answers to their questions.

Wallace said company officials expect that the system will help it achieve an important goal — reducing travel — by providing employees with access to their co-workers via the video site, which will be called PrimeTime.

The company's internal affinity groups — workers with common interests in performance management, career development and mentoring — were among the creators of the first videos for the library, Wallace said. Rohm and Haas expects 50 to 75 PrimeTime videos to be available to employees when the program debuts.

The videos are created and will be run using the Studio hosted webcasting service from Interactive Video Technologies Inc., Wallace said.

Over the long term, Rohm and Haas plans to extend access to Studio so that ever-increasing numbers of employees in all departments can produce videos for the PrimeTime library, Wallace said.

The Studio tools combine and synchronize audio and video, PowerPoint presentations and screen captures with "one-click publishing" on the desktop, according to Interactive Video officials. The system can also track the use of those videos, the company said.

Greg Pulier, founder and chief technology officer of Beverly Hills, Calif.-based Interactive Video, described the efforts of Rohm and Haas and other companies to build internal sites as moves that "democratize webcasting."

Such sites, he said, allow many employees to create, post and view videos that provide important information to other workers on their corporate desktop systems.

> **"If the infrastructure wasn't set up and put in place, this [PrimeTime] environment would have come apart very quickly.**
>
> **CHARLES WALLACE,** CHIEF TECHNICAL ARCHITECT AND IT DIRECTOR FOR GLOBAL ARCHITECTURE AND INFRASTRUCTURE, ROHM AND HAAS CO.

VIDEO HELP DESK

Rohm and Haas executives appear in online training videos that are available to the company's 15,000 workers around the world

For example, a top salesman could create on his own a video that demonstrates his process for selling products, Pulier noted.

He described the video sites that companies like Rohm and Haas are creating as a kind of second-generation corporate video strategy.

"A lot of organizations start [out by] using YouTube to post corporate videos," he said. "When they reach a point where there is too much stuff on YouTube, they start to look for another solution."

Several companies are still in the first stage of video use, posting marketing productions on YouTube and other video sites to improve marketing efforts — and to respond quickly to potentially negative news stories.

Dunkin' Brands Inc.'s Dunkin Donuts unit in late January launched a YouTube

Continued on page 16

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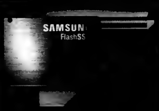

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Continued from page 14

channel to host a contest that called for customers to post their own videos related to the company's marketing slogan "America runs on Dunkin'." The YouTube channel generated more than 208,000 views before the contest ended on March 1, according to the Canton, Mass.-based restaurant chain.

And Southwest Airlines Co. last month created a YouTube video to dispute the assertions of two female passengers that they were escorted off a flight in Tampa in mid-February and banned from the airline for life for being too attractive.

TRAFFIC INCREASES

Analysts say that more and more companies are launching such YouTube-style videos to take advantage of a massive increase in traffic to video sites over the past couple of years.

According to a research report released earlier this year by the Pew Internet & American Life Project, traffic to video sites in 2007 increased considerably over the previous year's. Almost half — 48% — of the 1,300 Internet users surveyed said they visited a video-sharing site during 2007, compared with 33% in a year-earlier survey.

Just Grapes, a wine shop in Chicago, upgraded its site late last month and added videos on topics like how to select wines for specific occasions and advice from wine tasters around the world.

Don Sritong, the store's sommelier and owner, said that he decided to create the new video offering, called GrapeTube, based on the popularity of various videos he has posted to YouTube. Those videos provided customers with a look at wine seminars in the store, his own observations after visiting various wine regions around the world and other information.

Sritong found that more people were viewing the videos than were reading the company's e-mail newsletters. The company also determined that the return on investment from video marketing was 10 times higher than the return on print-related advertising, he noted.

"Wine is such an intimidating topic for people; it has been seen as this elite beverage," Sritong said. "That is not true. Video allows [us to] translate that better than print. Video is really the next step of closing the gap between those who felt wine was an elite beverage and those who are super intimidated by it."

Itzbig Inc., an online job site, launched an internal contest in January to judge employee-created YouTube-style videos promoting the company's goals.

"It was our way of getting the whole company as part of the marketing team," said Denise Court, vice president of marketing at Austin-based Itzbig. "It was a way to cut through a lot of the corporatespeak and bring an authentic voice."

The contest attracted 15 submissions. The winning video, created by a member of the company's customer service team, recommended new ways to promote Itzbig.com's policy of letting job seekers anonymously post their résumés.

The cost of producing online videos has declined significantly in recent years," Court noted. She estimated that several years ago, making a corporate video in a studio for distribution at trade shows could cost $15,000 to $20,000. In contrast, the winning video cost $2,500 to produce and will be distributed for free on YouTube later this month, she said.

"Wine is such an intimidating topic for people; it has been seen as this elite beverage. That is not true. Video allows [us to] translate that better than print.

DON SRITONG,
SOMMELIER AND OWNER,
JUST GRAPES

"Given the rich digital media we have today, we all of a sudden have an opportunity to use a platform that is inexpensive and easy to use for companies to express themselves, share ideas and collaborate," Court said.

Oliver Young, an analyst at Forrester Research Inc., said that external marketing will likely be the most popular use of video technology among corporate users in the coming years.

Training videos like those Rohm and Haas is planning to use may also become more common in very large companies, but they probably won't be as widely used in small and midsize companies because they require that users shift to a new, unfamiliar medium, he noted.

Wallace also pointed out that the "internal YouTube approach" requires significant network bandwidth and that not all companies have such capacity.

Rohm and Haas in recent years has installed an MPLS packet-switch network and compression technology that should easily provide adequate bandwidth for the PrimeTime video network, he said.

"We've had a very successful, stable performance environment," Wallace added. "If the infrastructure wasn't set up and put in place, this [PrimeTime] environment would have come apart very quickly."

"The external side is really where video is going to have a permanent home in the enterprise," Young predicted.

"The cost of distribution on YouTube is free, and the cost of production is [affordable] because people don't expect a high production quality," he said. "The consumer expectation has been set — this can be low-quality video."

Young did warn that once companies open the door for their customers or other external users to post videos about their brands or products — an important feature for online audiences — they are providing a forum for critics.

"Honest, open dialogue is the way to really tap into the community and gain the trust of the community," Young said. He did note, though, that "it is a strange mental shift for a lot of brand marketers who have felt like they have kept such a tight control over brand and message." ■

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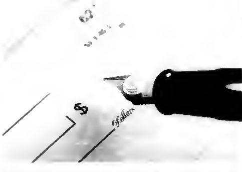


FOTOLIA

D.C.'s Tax System Won Plaudits – but Didn't Stop Alleged Fraud Scheme

Prosecutors say rogue workers cashed fake refund checks for years, despite the 2002 rollout of a $100 million tax processing system. **By Patrick Thibodeau**

FOR MORE than a decade, employees in the District of Columbia's Office of Tax and Revenue allegedly cashed millions of dollars' worth of fake property-tax refunds, then gave the money to friends and family members or spent it on real estate, cars, jewelry, clothing and other items.

And much of that happened behind the back of an award-winning $100 million tax system that became fully operational in 2002 after a three-year development and phased rollout process.

Since last November, federal and local authorities have arrested 10 people, including two D.C. workers. The two are due to be formally indicted by March 18, although prosecutors and defense attorneys asked for a 45-day extension of that deadline last week. Court documents point to the theft of at least $20 million via refund checks made out to sham corporate accounts.

While some of the alleged thefts were taking place, IT contractor Accenture Ltd. was building the D.C. government's Integrated Tax System. The ITS combined previously separate income, property and sales tax systems and created a single database for tax information. It also includes CRM software and gives taxpayers access to a set of online services.

The ITS didn't flag the allegedly fraudulent activities because they happened outside of the system, according to D.C. and Accenture officials. The alleged perpetrators "did not go anywhere near the ITS," said Mike Teller, CIO in the district's Office of the Chief Financial Officer. "As far as we know, everything that they did, they did because they went around the system."

But that begs the question of why a business process such as writing tax refund checks could be completed outside of the ITS.

The system won a national "outstanding technology" award from the Federation of Tax Administrators in 2002. But Harley Duncan, the FTA's executive director, said there are typically a few places in the refund process where a "fully functional" system might have caught the alleged fraud scheme.

For instance, Duncan said he would expect systems to check parameters such as the number of refunds being issued, who they were paid to and who was approving the payments.

Duncan added that the D.C. case is prompting tax administrators elsewhere to ask themselves, "What have we done lately to review our internal controls and make sure this doesn't happen?"

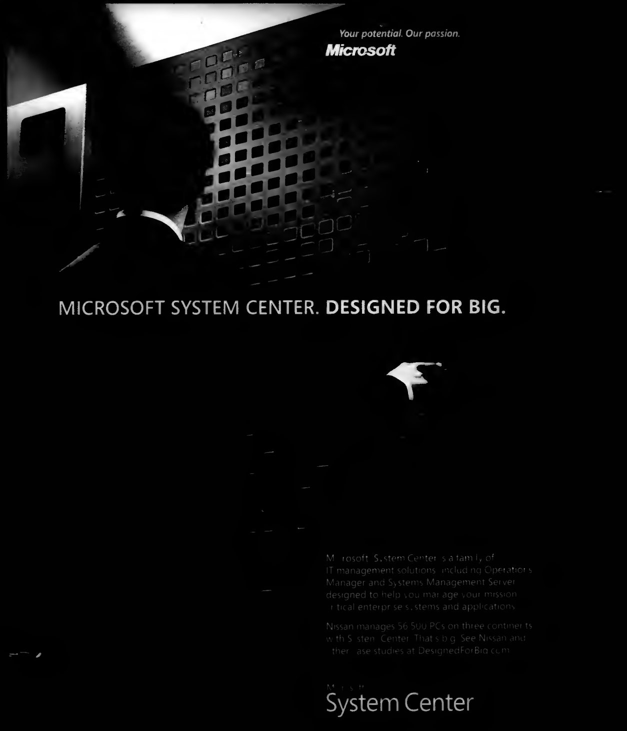
Teller said he was limited in what he could say because of the ongoing criminal investigation. But the ITS does include auditing, business intelligence and report-writing capabilities, he said. According to Teller, the IT staff had the task of ensuring that such features were in place in accordance with the requirements of the business unit. He said it was up to the tax office to decide which functions to use.

But Teller added that if there's a lesson to be learned, it's that even with all of the usual IT best practices in place, "all of a sudden, here's something else that maybe we need to be worried about."

A report issued in August 2006 by the D.C. government's auditor offered a possible warning sign to local officials. Auditor Deborah Nichols reviewed the performance of the ITS to assess the timeliness and accuracy of tax payments. Among the issues she raised was the lack of an electronic bridge between the ITS and D.C.'s accounting and financial reporting systems. That required manual intervention in the tax refund process, and the report noted that the employees who were cutting the checks were also reviewing them.

> **Harley Duncan,** executive director of the Federation of Tax Administrators, said the D.C. case is prompting tax officials elsewhere to ask themselves, "What have we done lately to review our internal controls and make sure this doesn't happen?"

It's unclear whether that process was connected to the alleged thefts. But in her report, Nichols sounded a cautionary note that seems startlingly prescient in hindsight. "Without separation of duties," she wrote, "the system is vulnerable to fraudulent schemes to misdirect funds to unauthorized payees or to the creation of dummy accounts." ■



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On the Mark

HOT TRENDS ■ NEW PRODUCT NEWS ■ INDUSTRY BUZZ **BY MARK HALL**

I THOUGHT YOU SAID "SECURE INTERSECTION TRAFFIC."
I MEANT IP TRAFFIC!
STOP MEANS STOP!
OW.
CIO

MATTHEW FAULKNER

Keep Traffic Flowing

YOU KNOW IP-based information is everywhere, even at stoplights, since traffic engineers get real-time data on vehicle flow from loop detectors and video feeds from cameras. But does such data need to be secured? Casey Potenzone, CIO at Uniloc USA Inc. in Irvine, Calif., argues that it does. He says cities are beginning to merge their IP data traffic, including information from intersections, onto single metropolitan networks.

IT secures other data, but that stoplight flow is ignored. He claims that could be a problem if hackers decide to mess with a city's traffic, as depicted in the film *Live Free or Die Hard*. Since most urban areas won't have Bruce Willis to save the day, Potenzone contends that they'll need to put a StrongPoint appliance at critical intersections. Unveiled last week, the appliance links to a StrongPoint server in a data center and encrypts all communications between the intersection and authorized personnel in the data center. Pricing for the field-hardened appliance starts at $2,500. Server software starts at $5,000 to manage up to 25 appliances. "Nobody says no to security," Potenzone says. Or, as Willis character John McClane says, "Welcome to the party, pal."

256k
Estimated number of U.S. intersections with signal lights, per the Institute of Transportation Engineers.

Vertica DB Tuned For Analytics

At first, relational databases handled lots of transactional information, and so relational database creators developed systems that were "write-centric," making them efficient and fast at storing data, says Andy Palmer, co-founder of Vertica Systems Inc. in Andover, Mass. Today, databases are used for more than transactional purposes. There's analytics, for one. According to Palmer, analytic applications need "read-centric" databases that store data differently. And that's just what the Vertica Analytic Database does, he claims.

In Version 2.0, which will ship this month, Vertica is also tuned to take advantage of modern microprocessors and servers, Palmer says. He cites Vertica's exploitation of the Level 2 cache in Intel chips, along with the copious memory and clustering technology in today's computer systems. The update adds new compression algorithms and will include support for many new analytic and management tools, including Cognos, Tableau, Golden Gate and Toad. Currently, the system can handle hundreds of terabytes of data, but, says Palmer, "we anticipate getting to petabytes in short order." Pricing is based on the amount stored.

Palmer: Analytic apps need read-centric databases.

Vignette Web Tools Update Gets Personal

Companies whose Web sites are based on Portal, Content Management or other software from Austin-based Vignette Corp. have a slew of new tools to choose from. Kirsten Knipp, senior product marketing manager, claims that the new software will give Web site visitors a more personal experience. For example, the Vignette Recommendations module analyzes a person's behavior on a site, compares it to the proclivities of users with similar profiles and makes recommendations of content accordingly. Although designed for Vignette software, Knipp says, the module can be integrated with content management and portal software from competitors as well. The company will also release an updated analytics module that shows Web site owners the most effective "touch points," in Knipp's words, for getting site visitors to buy a product, download a white paper, complete an online form — whatever the goal. In addition, Vignette will update its Rich Media Services tool so that business users will be able to manipulate digital assets, such as an image's size or color, without having to contact IT to make the change. Pricing information is unavailable. ■

MORE BUZZ
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■ THE GRILL

Window Snyder

Mozilla's security chief talks about building **multilevel defenses**, cooperating on **multivendor fixes** and finding a **vegan restaurant** on Google Maps.

What is the biggest threat to users today? My big concern is still the individuals out there trying to lure users into malicious sites, whether they're posing as a bank or a site they're familiar with. These things are painful. Users really feel it. The attacks come in through e-mail, they come in through Web sites. It's these broad-based attacks.

Do you see phishing attacks escalating this year? They'll get worse as long as the methods they're using are successful. As a software development community, we can identify ways to mitigate these attacks so they'll eventually move to something else. We need software that is strong enough to mitigate threats that attackers haven't thought of yet. It's about building in a multilevel security architecture so you're building in defense in depth, not building a defense against a [specific] security risk. You need multiple levels of security

Dossier

Name: Window Snyder

Title: "Chief security something-or-other"

Company: Mozilla Corp.

Location: Mountain View, Calif.

The name: "There's no story. I need to come up with a story. It's unfortunate because everyone wants to know, and there's just nothing."

Favorite pastime: "Snowboarding. Being outdoors. Getting a chance to be in the mountains. Everything is so clean and crisp. It's great to do with friends and push yourself a little bit."

In high school, she was: "Academically motivated. I was invested in doing my homework. I loved theater. I loved writing. I loved my high school, too."

> **“We need software that is strong enough to mitigate threats that attackers haven’t thought of yet.**

within an application, because you don’t know what’s coming next. It’s about building a secure application.

How far away are we from getting that kind of multilayered secure application? We currently try to build Firefox that way, but there will always be things that no one has thought of yet. It’s impossible to build a perfectly secure browser. That’s not the goal. The goal is to build the safest browser we can. It’s an ongoing process. It’s not a goal where we’ll say, “OK, we’re done.”

What’s the biggest security problem with browsers today? One of the things most difficult about browser security is that all browsers are designed to take content from an unknown site, and some of that content is going to be executable. Whether it’s a Java applet or a Java script or ActiveX control, it’s executing on a user’s browser. You’re enabling these robust applications on the Internet, this rich Web experience, while keeping the user and the machine safe. That’s a pretty difficult thing to do. Software exists to support some function that enables a user or business. It’s not for security to dictate what the user should do. That’s not how it should work.

IT keeps warning users to be cautious and not open attachments from unknown senders, for example. But users keep on doing it. Are users just dumb? Users are not dumb. I get upset when I hear that. They’re trying to accomplish a task. If the security interface gets in the way or if the security interface isn’t easy to understand, they’re going to go around it, whether it’s clicking through a certificate warning or trying to follow an e-mail link that says, “Your bank account is going to be frozen if you don’t confirm your personal information details on this page.” For all these things, the user is trying to accomplish a task. The attacker has created a sense of urgency. The easiest thing is to click on the link right in front of them.

What needs to be done about it? We can build mechanisms into browsers and e-mail software that will mitigate users being hurt by these attacks. Firefox 3 has antiphishing and antimalware mechanisms that identify that a site has malware on it and blocks the user from visiting it. The [user interface] will make it clear that this is a site that has malware on it, and it [won’t] let you click through.

Last year, you had to deal with some bugs in your protocol handler. What did you learn from that whole experience? One of the most interesting trends in application security is the interaction between multiple applications. We saw some of that this summer with the URI issues. [A uniform resource identifier is data that identifies a resource or location in a system or on the Internet.] We saw that with Safari to Firefox, and [Internet Explorer] to Firefox, and IE to Outlook and multiple applications. The URI stuff is just an example of a larger trend — interactions between multiple applications and vulnerabilities between them. It creates a situation where both vendors need to put protection in place. We’ve got multiple applications, so when you pass data from one application to the next, the application looks at the data like it’s coming from the local operating system but it came from the Internet. You can make it look like the content came from a relatively safe place. We got the fix out there, but that wasn’t enough because the other vendors need to create a fix for the other end of the problem. It’s hard when multiple vendors are involved. Users might think Firefox shipped a fix and everything is fine, but they need Microsoft to ship a fix for Windows and IE.

How difficult is it for different companies to work together on problems like this? It’s difficult, but in the end, we all want the same thing, which is to protect our users. Once we understand the technical issues, it’s just a matter of individuals doing the right thing for users. I really do believe we all have that in mind.

Last summer, some people were accusing both sides of finger-pointing instead of working together. Was that a problem? I think what other people might interpret as finger-pointing is people trying to demonstrate that just because we fixed a part of it, it’s not all fixed. A lot of what is really a technical discussion of a problem is interpreted as finger-pointing. I did see a lot of technical information interpreted as finger-pointing. It’s sensational and fun to read, but it’s not really what’s going on.

What’s the most exciting technology on the horizon? Oh, I’m excited about everything mobile. We’re building a browser for mobile devices. In my personal life, I’m excited every time an application is out for my BlackBerry. I never would have thought I need to go into Twitter, but I do. It’s a nice way to stay in touch with your friends. I love being in a new city and being able to look for a vegan restaurant and then find it on Google Maps. That kind of stuff is incredible to me. I’m just so excited about the mobile space.

— *Interview by* **Sharon Gaudin**

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OPINION

Virginia Robbins

Seven Rules for Life in a Start-up

I'M ON my first start-up. My experience had been at companies that were making significant strategic changes and wanted to ensure that IT could support the new direction. They were mature companies, at one time successful but now feeling that their choices were either to change or sell. Looking back, I realize that at every company, many of my recommendations focused on the fundamentals of IT management — project management, life-cycle planning, governance and staff development.

Given that tendency, you'd think that when I had the opportunity to create it all from scratch, I would remember the fundamentals. But at our first audit, I was informed that we needed to increase our focus on the fundamentals. Why had I neglected the very things I'd been preaching about for years? In hindsight, it's pretty easy to see the things I needed to be doing better:

1. Identify trusted consultants. I hadn't planned for the large number of terrific sales opportunities that would come our way. Having worked for mature firms, I wasn't prepared for a small company that had to move a lot faster; a start-up has to grab all the business it can to develop positive cash flow. In such an environment, you need a stable of consultants you can trust to solve problems. Consultants promise a lot, but you can end up spending as much time managing them as they do solving problems. Identify and test your consultants before you need them.

2. Hire well, and fix mistakes quickly. Small companies don't have time to work through personnel issues. You can't afford the loss of productivity. It may take a year to notice that one person isn't doing his share of the work in a 100-person team. In a three-person team, it's immediately visible. Identify hiring mistakes early and fix or fire (with due process) quickly.

> **In hindsight, it's pretty easy to see the things I needed to be doing better.**

3. Review responsibilities. Tasks that I did yesterday may not be the right things for me to concentrate on today. Every day, each task needs to be reviewed — am I really the right person to do this today? Tomorrow? Constantly reassess.

4. Put it all on paper. Even if you're doing it only for yourself, prepare project plans, write procedures, and draft your budget. Today, you may be a team of one, but tomorrow, you will be a team of three. It's easy to think you'll remember all your plans and processes. But you won't. Doing all this later takes twice as much time. Finish it today. Then reread Item 3.

5. Formalize the informal. At very small firms, a discussion at the coffee machine constitutes the same decision-making process for which a large company needs a highly structured committee meeting. You have no meeting minutes to confirm a mutual understanding. So I send out e-mails to make sure that both parties understand what we agreed to do.

6. Provide great customer service, but don't forget to make a profit. Many people think that good customer service means less profit. It's actually the opposite, but make sure that your customer understands this before you give out that great service. You still want to get paid.

7. Don't forget to have some fun. Remember why you chose a start-up. It means long hours and hard work, but it can be an incredible experience. So far, it has enabled me to gain much empathy for those IT managers who have been unable to keep pace with the strategic changes at their firms. Whatever happens here, each day gives me the opportunity to be that much better.

So in these uncertain economic times, if you find yourself thinking about creating your own start-up, remember the fundamentals, get ready to work hard, and have fun! It's a blast. ■

Virginia Robbins *is a former CIO who is currently the chief administrative officer responsible for bank operations at the California Bank of Commerce. You can contact her at vrobbins@sbcglobal.net.*

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What's Your Project Worth?

Figuring it out isn't easy. But you can't manage what you don't measure.

BY GARY ANTHES

DURING THE Great Depression, a body of academic work emerged to help people value investments. Economists explained how the concepts of risk, cost of capital and cash flow could be applied to the stock market. But soon business people, and later IT managers, learned that they could apply those same concepts to evaluating the financial returns from projects.

The workhorse measures of financial return that came out of that period — and really took off in the 1950s — haven't changed much over the years, nor has the math behind them. But as the strategic mission of IT continues to shift from saving money on back-office functions to enhancing revenue, "return on investment" has taken on new meanings and importance. And as companies increasingly try to include intangibles such as customer satisfaction into their return metrics, IT and finance professionals are finding new ways to deal with uncertainty.

"Phase I for us was all about cost savings, so ROI was about the bottom-line impact of projects," recalls Robert Scott, vice president of information and decision solutions at The Procter & Gamble Co. "Now we have moved to a phase called 'value creation,' which is a combination of bottom- and top-line ROI."

The "top-line" objective most often is sales, he says, but it could be something else, such as faster movement of cases of Tide, Pampers or Pringles through P&G's $76 billion supply chain.

That broadened focus is typical. "The biggest change I have seen in five years is what I call the bifurcation of technology between the operational and the strategic," says Steve Andriole, a professor of business technology at Villanova University.

"It has phenomenal implications for project prioritization and ROI. To a great extent, Nick Carr was right — operational technology has been commoditized," Andriole says, referring to the former *Harvard Business Review* editor who famously wrote that "IT doesn't matter."

"Operational" projects — like upgrading a network, replacing PCs or even automating a back-office function — are usually all about cost savings, Andriole says. They are subject to fairly straightforward, tried-and-true evaluation metrics, and IT has this well in hand. "IT people have gotten so much better over the past five years," he says. "The practice of the discipline has improved through use of business cases, the quantification of metrics, the use of benchmarking data and industry data."

Operational IT projects are about saving money, but strategic ones are about making money, says Andriole. An example of the latter might be a project to integrate databases across business units to facilitate cross-selling. The cost of doing that could be relatively easy to estimate, but the benefits would be harder to quantify, he says.

At least the benefits of cross-selling are known qualitatively. But in some cases, the benefits from an IT investment may be dimly perceived or even unknown. For example, Andriole says, "how do you quantify the benefits of

PEP MONTSERRAT

open-source vs. proprietary software, or the benefits of Web 2.0? Companies love Web 2.0, and they are deploying it like crazy. What impact is it having on collaboration or communication or business performance or customer service? No one knows."

THE BASICS

Despite the difficulty of developing good estimates, especially of benefits, four basic methods for comparing project costs and returns remain in vogue: payback period, ROI, net present value (NPV) and internal rate of return (IRR). Many more have been developed, but these four metrics have endured for decades. Even so, experts warn, each of them can lure the unwary into pitfalls.

Ian Campbell, CEO of Nucleus Research Inc., is an advocate of keeping things simple. "The worst thing you could do is come up with the next trendy metric," he says. In fact, Campbell says, companies really need only two measures: ROI and payback period.

Although he favors using the simplest measures, Campbell does suggest tweaking them with "adjustment factors" to allow for real-world uncertainty. He recommends applying a "believability" discount factor — something that would reduce the estimated benefit to reflect its uncertainty — to the estimates that go into ROI calculations.

For example, estimates of direct, measurable cost savings might be used at their full value. But estimates of indirect cost savings tied to increases in worker productivity might be discounted by 50%, and "very indirect savings" from increases in manager productivity would get discounted even more, Campbell says. That makes the resulting number more conservative and eliminates a certain amount of wishful thinking, he notes.

But Campbell cautions against allowing discount factors to be applied on an ad hoc basis. Often, he says, each person in a chain of command reduces the estimated benefits in order to avoid later being seen as reckless. "The chief financial officer doesn't trust the IT department anymore because the IT department has just made up too much stuff," he explains.

Instead, he recommends that all the stakeholders in the process — the analyst preparing the estimates, the project manager, the CIO, the CFO — work together to develop realistic discount factors and then apply them as consistently as possible from project to project.

Collaboration between IT and finance is what goes on at P&G, where a person from finance is assigned to work on every major IT project. That person helps prepare estimates of cost savings, incremental sales and return on assets, the three key measures of financial success for a project at P&G. A favorable number in any of these areas can get a project approved; but the cost and sales numbers cranked into an NPV calculation are the most frequently used for IT projects. "Any one of those creates value for the company, for our shareholders," Scott says.

At one time, P&G tried to apply factors to discount the most uncertain numbers, but it found that the extra effort had little payoff. That's not to say that the company ignores intangible benefits in its cost-benefit models. In fact, while cost, revenue and return on assets provide an important initial filter, projects also must be seen as meeting other, "softer" targets, Scott says.

Those soft targets, such as boosting customer satisfaction, increasing customer touch points or improving product quality, become part of the goals of the project and live on after the project has ended as quality measures to monitor. The goals can be intuitive — "You know it when you see it" — but managers do attempt to quantify them, Scott says. Sometimes a proxy measure is adopted. For example, the number of customer complaints becomes a measure of product quality.

DEALING WITH UNCERTAINTY

How to include these soft metrics in a financial analysis has become a matter of much debate. Some companies don't do it at all because it is thought to be too hard or subject to too much manipulation, says Nick Vitalari, an executive vice president at BSG Alliance Corp., an on-demand software and services firm. "Companies think they can't quantify the benefits side," he says, "but that's simply not true. You have to use some creativity."

Vitalari says one method that is becoming increasingly popular is to conduct "business experiments," which for IT could be system prototypes, possibly linked to test marketing. Even fairly straightforward projects, where the costs and benefits are predictable, can

Continued on page 32

ROI: TRICKIER THAN IT LOOKS

ROI (annual return divided by initial investment) has been a favorite metric for years. It's easy to compute and easy to understand. But it can be dangerously misleading. Consider these traps:

Which is a better investment?

PROJECT A	ROI 10%
PROJECT B	ROI 15%

But what if . . .

PROJECT A	ROI 10%
[illegible]	
PROJECT B	ROI 15%
[illegible]	

What is the annual ROI from Project C, where $1 million is invested?

YEAR 1	$0
YEAR 2	$100 000
YEAR 3	$250 000

[illegible]

Which of these projects has a "better" ROI? Which would you fund?

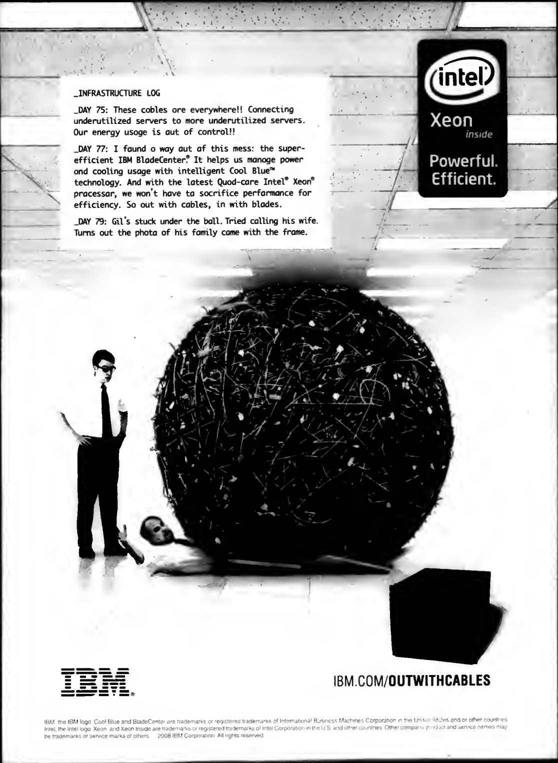
	[illegible]	[illegible]
[illegible]	15%	5%
[illegible]	10%	10%
[illegible]	5%	15%
[illegible]	0%	20%

[illegible]

Is a project with a guaranteed ROI of 10% a good investment?

[illegible]

– GARY ANTHES



_INFRASTRUCTURE LOG

_DAY 75: These cables are everywhere!! Connecting underutilized servers to more underutilized servers. Our energy usage is out of control!!

_DAY 77: I found a way out of this mess: the super-efficient IBM BladeCenter.® It helps us manage power and cooling usage with intelligent Cool Blue™ technology. And with the latest Quad-core Intel® Xeon® processor, we won't have to sacrifice performance for efficiency. So out with cables, in with blades.

_DAY 79: Gil's stuck under the ball. Tried calling his wife. Turns out the photo of his family came with the frame.

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THE BIG FOUR

1 **Return on investment (ROI)** is often used as a generic term for any kind of measure that compares the financial costs and benefits of an action. But in finance, ROI, sometimes just called "rate of return," specifically refers to a percentage calculated by dividing the annual return from an investment by the initial amount of the investment. If you put $100 into a savings account and have $105 a year later, your ROI is 5%.

2 **Payback period**, in months or years, is equal to the investment amount divided by the monthly or annual incremental cash flows from the investment. Basically, it tells you how long it will take to get your money back.

3 **Net present value (NPV)** is the present (discounted) value of future cash inflows minus the present value of the investment and any associated future cash outflows. It's the net result of a multiyear investment expressed in today's dollars. Sometimes it's just referred to as "discounted cash flow."

4 **Internal rate of return (IRR)** is the discount rate that results in a net present value of zero for a series of future cash flows. It uses the same principles as NPV. It's a cutoff rate of return that shows the discount rate below which an investment results in a positive NPV (and should be made) and above which an investment results in a negative NPV (and should be avoided).

For a detailed explanation of these metrics as well as examples of how to apply them and caveats about their use, please see computerworld.com/more.

Continued from page 30

benefit from experimentation, he says.

Experimentation happens frequently at P&G, where there isn't a single go/no-go decision point for a project.

"More and more, we do quick pilots, so you do a lot of learning early on before investing heavily," says Scott. "Is this really something that will create value? Does the technology work? We call it an 'innovation funnel,' where the funnel is wide at the beginning but you have gates where you weed out options as the project progresses."

The Schwan Food Co. uses NPV, IRR and payback period to evaluate IT projects costing more than $1 million. Cost estimates are developed by IT, but the benefits estimates come from the business units, according to CIO Kate McNulty.

When benefits are hard to quantify, IT helps business managers do that, McNulty says. Such calculations can be dealt with in two ways, she suggests. The first involves sensitivity analysis. She explains: "We might ask, 'What if my benefits come in at only 75% of what I have estimated — what's my IRR? What if they come in at 50%?' "

The second way is to compute an "expected value," the dollar amount of an outcome multiplied by the probability of its occurring. "If I say I'll get $100,000, and my confidence in getting it is 50%, then that goes into the analysis as $50,000," McNulty says.

She says the biggest change she has seen in IT cost-benefit analyses in recent years is a new rigor in doing project postmortems and putting lessons learned from them back into the planning process. "In the past, a lot of business cases were put together, but they weren't validated after implementation," she says.

The project postmortems at Schwan Food are done jointly by IT and the business units. McNulty offers an example of a lesson learned from this process: "When you are defining a project, make sure you have distinct baseline numbers."

More and more, we do quick pilots, so you do a lot of learning early on before investing heavily. Is this really something that will create value? Does the technology work? We call it an 'innovation funnel,' where the funnel is wide at the beginning but you have gates where you weed out options as the project progresses.

That's because multiple simultaneous projects might all have improving customer retention as a goal, so that at the completion of any of them, it's not clear just what led to a change in that metric. "So you want to uniquely quantify the benefit and exactly tie it to the initiative," McNulty says.

But, cautions Christopher Gardner, co-founder of consulting firm iValue LLC, if employees know that heads will roll whenever subpar performance is revealed, they will resist postmortems on the projects that need them most. "It takes discipline, and a management open to learning," he says.

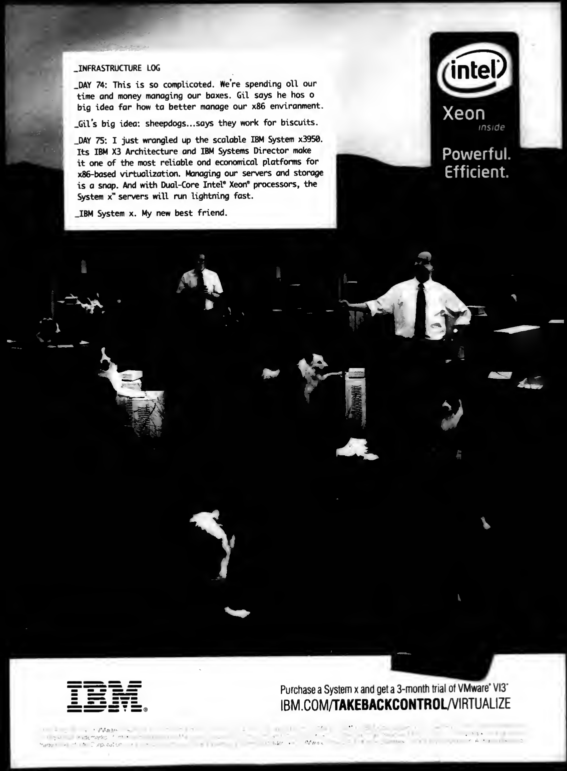
Harrah's Entertainment Inc. uses three metrics to prioritize IT projects: primarily NPV, and secondarily IRR and Economic Value Added (essentially ROI less the cost of invested capital). Increased sales is usually the key benefit to be measured, but the business sponsor of a project works with IT to measure softer benefits such as increased guest visits at Harrah's hotels and casinos, customer satisfaction and even employee satisfaction.

Using more than one metric has pros and cons, says Harrah's CIO Tim Stanley. "Using multiple criteria to assess a project provides a robust framework for decisions," he says. "Each tool takes into consideration the investment and the expected business value or return, and we are not limited to a single point of view." But, he adds, the prospect of sophisticated financial analyses can inhibit some people from submitting ideas for consideration.

Indeed, the work involved in doing any kind of rigorous financial analysis can be daunting, Gardner says.

"It's a blend of corporate strategy and corporate finance and high technology," he says. "Each of those fields is fairly complicated, and when you combine them, you are dealing with some of the most challenging problems a company has.

"And incentives are not always there to come to the right answer," he adds. "The incentives are to get the system built." ■



_INFRASTRUCTURE LOG

_DAY 74: This is so complicated. We're spending all our time and money managing our boxes. Gil says he has a big idea for how to better manage our x86 environment.

_Gil's big idea: sheepdogs...says they work for biscuits.

_DAY 75: I just wrangled up the scalable IBM System x3950. Its IBM X3 Architecture and IBM Systems Director make it one of the most reliable and economical platforms for x86-based virtualization. Managing our servers and storage is a snap. And with Dual-Core Intel® Xeon® processors, the System x™ servers will run lightning fast.

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IBM®

Purchase a System x and get a 3-month trial of VMware® VI3™

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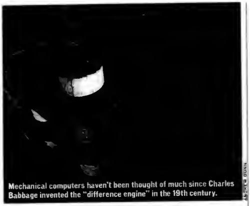


Mechanical computers haven't been thought of much since Charles Babbage invented the "difference engine" in the 19th century.

ANDREW DUNN

Different Engines

Researchers are building mechanical computers, with moving parts, that could someday work where silicon-based processors fear to tread. **By Gary Anthes**

IN THE 19TH CENTURY, British mathematician Charles Babbage invented the "difference engine," a mechanical computer that had an enormously complex arrangement of levers, ratchets and gears. Had this prototypical chunk of steampunk machinery ever been completely built, it would have weighed several tons.

Now, mechanical computers are back. Teams of scientists across the U.S. are building new versions, though they're a bit smaller. In fact, the moving parts in these "nanomechanical" computers may eventually be smaller than the smallest silicon transistors.

The research is being funded by the U.S. Defense Advanced Research Projects Agency, which hopes to develop computers that can survive in hot spots where conventional semiconductors would fry, such as inside weapons. Researchers say that the tiny mechanical computers will be far more energy-efficient than traditional semiconductors, will produce less heat and will withstand hig voltage spikes that can burn out ordinary processors.

Some of the companies that are racing to get the next round of DARPA funding foresee myriad civilian applications for the tiny mechanical computers.

At GE Global Research in Niskayuna, N.Y., "there may be applications across multiple GE businesses, but it's not crystallized yet," says researcher Kanakasabapathi Subramanian.

researcher, GE Global Research

That's because the technology is far from proven. GE and other companies and universities with DARPA funding are just beginning to show that physical devices can be made to move and do useful things in spaces comparable to those occupied by today's silicon nanocircuits. GE has used a "bottom-up self-assembly" method to grow nanowires from a silicon base. The hope is to make the wires act as switches, the fundamental building blocks of computers. Combining the nanowires with conventional circuit etching by lithography would result in a kind of electromechanical relay switch.

professor of electrical engineering, University of Wisconsin

"Mechanical switches offer some unique advantages over solid-state electronic switches like transistors," Subramanian says. "One is the ability to minimize the heat that's generated within the system. Because you have a physical air gap, you minimize leakage currents that give you heat. When the switch is off, it's really off."

Having shown that it can make the nanowires move, GE is now attempting to make a working three-terminal switch. The eventual goal at GE and elsewhere is to combine the switches in various ways to build logic gates. Some researchers hope to build nanomechanical memories as well.

Researchers at the University of Wisconsin - Madison have built a transistor out of "nanomechanical pillars." The pillars are made of silicon oxide tipped with gold, and the smallest are 30 nanometers at the base — smaller than the circuit features in today's silicon chips. Robert Blick, a professor of electrical and computer engineering, says he has made the pillars act as physical switches that he calls NEMSETs, for nanoelectromechanical single-electron transistors. He says he hopes to someday build the pillars using diamond or sapphire, which are much more thermally stable than silicon. "We can go down to 10nm with current technology," he adds.

While nanomechanical devices have several advantages over semiconductors, they are unlikely to ever match the performance of

History Watch

Excerpts from the talk "Plenty of Room at the Bottom," by physicist Richard P. Feynman at Caltech on Dec. 29, 1959:

■ Computing machines are very large; they fill rooms. Why can't we make them very small, make them of little wires, little elements? And by little, I mean *little*. For instance, the wires should be 10 or 100 atoms in diameter. . . . There is nothing that I can see in the physical laws that says the computer elements cannot be made enormously smaller than they are now.

I am not afraid to consider the final question as to whether, ultimately, we can arrange the atoms the way we want – the very atoms, all the way down! . . . At the atomic level, we have new kinds of forces and new kinds of possibilities, new kinds of effects. The problems of manufacture and reproduction of materials will be quite different. . . . [But] the principles of physics, as far as I can see, do not speak against the possibility of maneuvering things atom by atom.

Let's have some fun! Let's have a competition between laboratories. Let one laboratory make a tiny motor which it sends to another lab, which sends it back with a thing that fits inside the shaft of the first motor.

– Edited and summarized by *Computerworld*. Text and photo courtesy of the California Institute of Technology Archives, Pasadena.

silicon-based processors, Blick says, since they are limited to clock speeds of about 2 GHz. But, he notes, the mechanical parts can be built on top of a silicon substrate so that performance-demanding functions could be carried out on conventional CMOS coupled to the mechanical computer.

The next step, Blick says, is to build simple logic devices, such as XOR and NAND gates, and combine them into complex logic circuits. But that's still only the beginning. A single logic device must then be made to drive a number of other devices in a chain that doesn't lose voltage, a process known as "fanout." Finally, ways to manufacture them cheaply and reliably must be found.

The design being worked on at the University of Wisconsin, unlike the one at GE, could be manufactured using more-or-less conventional chip-making processes such as lithography, Blick says. He's says that he is in talks with Paris-based Alcatel-Lucent but that any commercial applications are probably five years away.

In the meantime, Blick and his colleagues will try to make nanomechanical memories consisting of pillars that can represent 0 or 1 (a bit), depending on whether they swing left or right. Nanomechanical memories might employ "multivalue logic," he adds. A pillar might signal three logic values rather than just two, and a membrane-like structure might be able to have one of as many as 10 values, depending on its vibration frequency.

Because of the speed limitations, nanomechanical computers are likely to be seen first in applications where very fast processors are not required and in places where temperatures could reach several hundred degrees Celsius, Blick says. There are many places where microcontrollers — very simple, low-speed, energy-efficient microprocessors — could be made from NEMSETs, he says.

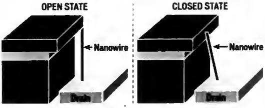
"They have to be cheap, they can be slow, and they only have to have several logic functions in them," Blick explains. "We can compete with simple microcontrollers costing less than $1, the kind used in a dishwasher or, for DARPA's purposes, counting the bullets in your machine gun."

He cites research at IBM that has suggested that the thermal properties of conventional semiconductors will become so unmanageable by 2015 that completely new approaches to computing will be needed.

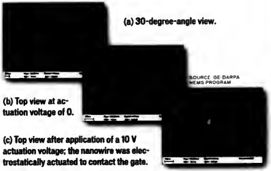
"In the future, there will be microcontrollers everywhere," Blick says. "They will be very simple processors based on alternative principles, where one is endurance to extreme environments and the second is energy efficiency."

GE's Subramanian says it's remarkable that the age-old principles of mechanics — long abandoned by computer designers — could make a comeback. "There's enough push right now, and enough technological advancement," he adds, "to potentially bring back a lot of these 'old' technologies and use them in new kinds of applications." ■

Schematic of a nanoelectromechanical systems (NEMS) electrostatic nanoswitch consisting of a gate, source, drain and nanowire actuator.



Scanning electron microscope images of a 38nm-diameter silicon nanowire 33nm away from a gate electrode.



(a) 30-degree-angle view.

(b) Top view at actuation voltage of 0.

(c) Top view after application of a 10 V actuation voltage; the nanowire was electrostatically actuated to contact the gate.

SOURCE GE DARPA NEMS PROGRAM

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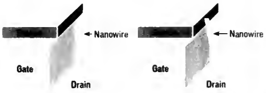

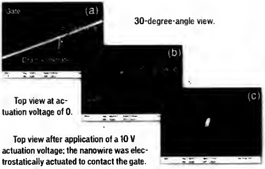

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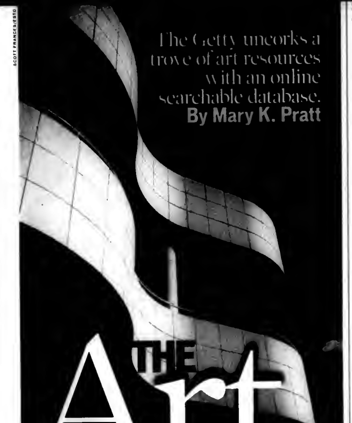
SCOTT FRANCES/ESTO

THE Art OF CATALOGING ART

The Getty uncorks a trove of art resources with an online searchable database.

By Mary K. Pratt

THE J. PAUL GETTY TRUST publishes the Art & Architecture Thesaurus, a priceless resource that art historians use to research terms, descriptions and bibliographic citations related to art and architecture.

But as valuable as it is, the AAT, which was first published as a three-volume tome in 1990, wasn't very easy to search, edit or update. So the Getty Trust turned to technology for help.

The organization's information technology services (ITS) unit responded by creating a thesaurus construction and publication system that now supports the Getty's Global Art Resources program, a Web-based resource that includes the three thesauri. The system has improved access to the electronic vocabulary databases and made the information in them more usable.

"We've unlocked art resources for anyone who is interested, not just art researchers and museum professionals," says ITS director Marilyn Gillette.

The Getty Vocabularies project was recognized as the 2007 winner in the Media, Arts and Entertainment category in the annual *Computerworld* Honors program.

"The Getty is one of the most respected and important sources for controlled vocabularies," says Karen Calhoun, vice president of the WorldCat and metadata services at the Online Computer Library Center, a nonprofit membership organization based in Dublin, Ohio.

The groundwork for such innovation dates back nearly three decades.

The Getty started building the AAT in 1980, aiming to gather disparate pieces of information in one place, says Murtha Baca, head of the Getty Vocabularies program at the Getty Research Institute.

The art community catalogs art, architecture and cultural artifacts, just as libraries catalog books, Baca explains. However, while the library world has standard cataloging tools, such as Library of Congress subject headings, the art community didn't have anything like that when the Getty project began. Through the AAT, the Getty hoped to provide tools, standards and best practices for documenting works of art.

"It was to provide a standardized tool, to provide a central point so everyone creating these terms can contribute them to one vocabulary, and we in turn could make them available to the entire community," Baca says.

Continued on page 38

At a Glance

- **The J. Paul Getty Trust in Los Angeles is an international cultural and philanthropic institution focused on the visual arts. There are four programs under the trust's umbrella: the J.Paul Getty Museum (at left), plus a research institute, a conservation institute and a foundation.**
- **Project champions include project manager Joan Cobb and lead programmer Gregg Garcia, who worked with an IT project team of about 15 Getty staffers and five outside consultants.**
- **About 70 workers make up the IT staff today.**
- **The Getty spent $570,000 between 1998 and 2006. It doesn't calculate financial ROI, but project officials say benefits include increased access to data, easier and more efficient searches and updates, and the ability to collect more data and build additional databases.**

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Continued from page 36

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Early on, Getty workers saw the advantages of the electronic versions, Baca says. Researchers could find what they were looking for more quickly, and editors could update records more efficiently. "The Getty did realize that technology could be a tool for studying art history," Baca says.

TECHNICAL HURDLES

With the data actually in place, the challenge became a technical one.

"The AAT and the ULAN initially resided in two totally different and equally proprietary computer systems," says software architect and project manager Jon Cobb. The TGN resided in older terminal technology.

Cobb says one of the first tasks was to bring all three vocabularies into the same technology before making them accessible to users on the Internet. It quickly became clear, however, that there were no commercial applications that could meet the Getty's needs. Off-the-shelf programs, for instance, couldn't merge and unmerge records as editors needed.

So Cobb successfully lobbied to build the applications internally. After gathering user requirements, Cobb's team opted to use Oracle databases with PowerBuilder from Sybase Inc. for the user interface. The team also made heavy use of Perl and SQR, a reporting and database access language.

The resulting tool, known as the Vocabulary Coordination System (VCS), offered a single production system that allows Getty staff to collect, analyze, edit, merge and distribute terminology generated by Getty departments and contributors at other institutions.

At the same time, Cobb's team, working with the ITS division that concentrated on the Web, redesigned the Web interface. According to Cobb, that involved reformatting all the records so that all terms could be searched regardless of whether the seeker knew which was the most accepted one.

GETTING REQUIREMENTS RIGHT

Members of the IT staff and the Getty Vocabularies program say accurate user requirements were essential to the overall success of the project. Here are the steps they took to ensure they got the requirements right:

Assigning the right IT workers. **Because they worked with vocabulary editors previously, the IT staffers understood the nature of the program.**

Starting with a glossary. **A list of terms and their definitions helped minimize miscommunication and misunderstandings.**

Reiterating needs. **Treating the requirements as a working document allowed IT employees and users to work out kinks before the product was delivered.**

Committing enough time. **"We try to do realistic timelines," says Murtha Baca, head of the Getty Vocabularies program. A benefit of that approach is that it allows IT staffers to observe the user's work.**

Gillette attributes the success of the project to several factors. First, she says, her technologists had an intimate understanding of the subject matter because they had worked with Baca and her team prior to undertaking the project. Cobb's team was also diligent in gathering user requirements, and all the team members involved shared a common vision.

"The interaction and spirit of cooperation between the IT staff and the people in art history made this a success," she says.

Today, the Getty's technical staff supports the VCS, the Getty Vocabularies on the Web, Web-based forms for the automated contribution of single records, and programs to automatically load batches of contributed data in XML format. The team also supports programs to produce yearly exports in XML, relational tables, and the Marc (Machine-readable Cataloging) format for institutions and commercial entities that license data sets.

"There's so much information, so much to organize by way of information, that if you didn't have a database and easy access to the information and a way to make that system available to so many people, you just couldn't do it," says Kay Bearman, senior administrator of modern and contemporary art at the Metropolitan Museum of Art in New York.

The vocabularies average more than 900,000 searches per quarter. Those using the vocabularies range from librarians and archivists to art and architecture historians, software system implementers, vendors and vocabulary providers. Even the general public can access it for free, at *www.getty.edu.*

Although the Getty doesn't calculate fiscal ROI, Baca says it's clear that such free and easy access to information offers a significant benefit. And since individual institutions have traditionally built their own databases, the vocabularies reduce the amount of redundant work. The technology has also the streamlined update process — it's easier for contributors from the Getty and other institutions to submit information, and it's easier for editors to verify and confirm the information.

Looking ahead, the supporting technology allows for expansion that's already under way. The Getty is importing databases, such as the University of New Mexico's collection of Native American artist names, to its vocabularies, and it is adding a fourth vocabulary, the Cultural Object Name Authority.

"We've come through the most difficult time with the project," Cobb says, "and we're really grabbing hold of what's most interesting about this: growing the vocabularies and making a difference in how people access information." ■

Pratt *is a* Computerworld *contributing writer in Waltham, Mass. Contact her at marykpratt@verizon.net.*

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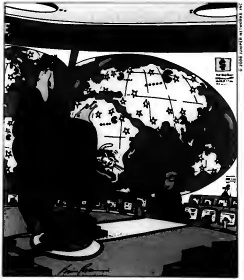

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■ SECURITY MANAGER'S JOURNAL | C.J. KELLY

Security Thoughts On Consolidation

Told to think about **virtualization,** our manager comes up with **lots of questions** about the **security implications.**

AS BUDGETS have tightened and staff sizes have decreased in the state government I work in, the drumbeat for consolidation has gotten louder. Until now, it has sounded to me like two parts politics and one part hype, so I've tried to ignore it. I don't think I'm going to be able to keep doing that, and so I will have to face the security implications head-on.

Politics is always a big factor in government, of course. Some people are quite taken with the magical idea that if you take all the IT and security people in the state and organize them under one umbrella, you will realize efficiencies and cost savings. Magical thinking isn't my thing; I can't help but wonder how this wonderful idea would work in the real world, where every state agency has its own business needs and requires different support skills, where offices are distributed across a rather big chunk of terrain, and where network, server and desktop standards are, to say the least, varied. And everything we do these days is constrained by crippling budget cuts. Yet we would have to spend a lot of money standardizing across the board before we could consolidate support.

However, an agency that is part of the same department as mine has been touting virtualization as the key to cost savings. My boss is being pressured by management to respond. He said he didn't want me to work on this immediately, but to think about it. That was nice of him, since he knows I don't have the time for anything extra.

Thinking about it raised a lot of questions for me. For starters, are we talking about server virtualization, desktop virtualization, storage virtualization, or what? Are we going to identify services that can be shared and serve up those applications from a data center housing virtualized servers and storage? How does that impact bandwidth? Who's going to be responsible for a statewide cost-benefit analysis? And how does all this affect security?

■ I can't help but think about how consolidation would work in the real world.

THINKING SECURITY

I am of the school of thought that says that, outside of some specific purposes, virtualization is not ready for prime time. I also think security is not served by putting all your eggs in one basket — my view of server virtualization.

But, I remind myself, I'm not in charge. What I need to do is analyze what, if any, components of our environment can be virtualized. Then I need to analyze the effect on security.

So far in my analysis, I've been focusing on server virtualization, since that is what I believe most of the huff and bluff is about. First up for review is the concept of the hypervisor layer, in which, basically, the server hardware is decoupled from the operating system. There are virtues to that idea, but I need to understand what vulnerabilities or security risks are inherent in that layer.

Trouble Ticket

AT ISSUE: Consolidation and virtualization are on the table.

ACTION PLAN: Think of all the security implications ahead of time.

Second, if in the virtualized server environment, "server instances" can be moved from physical location to physical location as usage needs demand, how do the network intrusion-prevention mechanisms keep up? What about static firewall rules? We would have to rethink our network security strategy.

Then there's the patching cycle. I'm not sure I can get my head around the complexity of patching and testing in such a fluid environment. And our monthly security self-assessment process could become unworkable. We scan our environment for vulnerabilities, remediate the problems we find, and repeat. I don't know how that will work if applications are moving around.

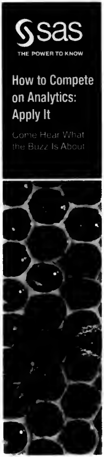
It also looks as if we will be shifting costs from the desktop to the data center. Initially, I see huge costs and no savings.

I've just begun to scratch the surface. Now that I've thought about it, I think I'm going to hold off to see whether the state is going to move slowly in that direction before I put any more energy into this. ■

JOIN IN
To join the discussion about security, go to **computerworld.com/blogs/security**

This week's journal is written by a real security manager, **"C.J. Kelly,"** *whose name and employer have been disguised for obvious reasons. Contact her at mscjkelly@yahoo.com.*

How to Compete on Analytics: Apply It



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■ **OPINION**

Bart Perkins

Pulling the Plug On a Project

FEW ORGANIZATIONS want to admit that a large project is failing. But some projects will never meet their deadlines or deliver the expected benefits. When the possibility of success is gone, these projects often must be euthanized for the health of the corporation.

Killing a major project is a difficult decision requiring complex and objective analysis. It also requires a plan for dealing with potential ramifications. Before pulling the plug, be prepared to address the following issues:

Political fallout. Most large projects have politically powerful advocates who become emotionally invested in the effort. When their favorite projects are killed, these advocates may point fingers or mount campaigns to identify and punish the guilty (or even the innocent, but usually IT). Design a response to creatively mute the critics without being overly defensive.

Associated expenses. Canceling a project can result in considerable expense. Severance packages are costly. Previously capitalized expenses must be written off against current earnings. The project may also have contractual obligations for hardware, software or services. Many contracts also contain early-termination penalties. Be prepared to discuss the financial repercussions with your CFO and CEO.

Unexpected behavior. Canceling a project can lead to unanticipated (and sometimes undesirable) behavior. One company wanted desperately to avoid taking a write-off in its current fiscal year. It reduced the size of the project team, making it impossible for the remaining members to complete the project. The company successfully postponed the write-off for 15 months, but the tactics it engaged in skirted the boundaries of ethical financial reporting.

Supplier relationships. Project cancellations affect your suppliers, too, and will seriously damage your working relationships. Trying to wiggle out of your contractual agreements may result in litigation. Offended suppliers might refuse to work with your organization again. In addition, they will tell everyone they know, resulting in potential damage to your corporate reputation.

■ **Killing a major project is a difficult decision requiring complex and objective analysis.**

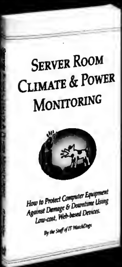
Lost business opportunity. Whenever a project is killed, the associated business opportunity is lost (or, at best, postponed). If the canceled project was expected to enable the company to enter new markets, the effects on revenue and earnings may be significant. Be sure to evaluate the long-term business impact during the decision-making process.

Morale. Project teams can become emotionally invested in a project's success. If the project is eliminated, morale can suffer. Remaining team members may become unproductive, and those with highly marketable skills may decide to leave (particularly if only a few undesirable projects are offered as alternatives). Derogatory comments from disillusioned employees can make it difficult to retain other IT staffers for future projects or to attract new employees. Clearly communicate the reasons for eliminating a project, as well as opportunities for other interesting work within the company. Enlist your company's communications department to minimize fallout.

Media coverage. Years ago, disgruntled employees had limited outlets for expressing their dissatisfaction. Even if a whistleblower got media coverage, the story would be quickly replaced by other news. But social networking and electronic publishing are changing this. The permanence of blogs, wikis and archives (combined with comprehensive search capabilities) make it easy to keep a story alive forever. It is increasingly important to deal with employee complaints openly, fairly, and in a timely and straightforward manner.

Making the decision to kill a large project is never easy. Weigh the trade-offs carefully, and evaluate all the potential ramifications. And have a comprehensive plan to address anticipated political, financial and employee issues. ■

Bart Perkins *is managing partner at Louisville, Ky.-based Leverage Partners Inc., which helps organizations invest well in IT. Contact him at BartPerkins@LeveragePartners.com.*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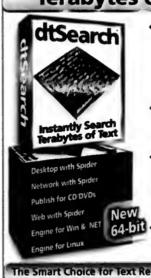

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Career Watch

Rose-Colored Retirement

Active workers expect personal savings to be among their largest sources of income in retirement. Those already retired are more likely to cite Social Security.

	WORKERS (EXPECTED)	RETIREES (ACTUAL)
Personal savings	50%	24%
A workplace retirement savings plan, such as a 401(k)	28%	6%
Other personal savings or investments	22%	18%
Social Security	14%	40%
A traditional employer-provided pension	13%	21%
Employment	11%	2%
The sale or refinancing of your home	2%	2%
Something else	3%	4%
Don't know/refused to disclose	6%	5%

MULTIPLE RESPONSES ALLOWED

Reported total savings and investments, not including value of defined-benefit plans or primary residence, for active workers by age group, 2007:

	AGE GROUP			
	25-34	35-44	45-54	55+
Less than $10,000	50%	30%	24%	26%
$10,000-$24,999	18%	18%	10%	5%
$25,000-$49,999	9%	10%	11%	9%
$50,000-$99,999	10%	14%	15%	11%
$100,000-$149,999	7%	7%	9%	11%
$150,000-$249,999	1%	9%	10%	8%
$250,000-$499,999	1%	4%	12%	11%
$500,000 or more	4%	4%	9%	17%

SOURCE: EMPLOYEE BENEFIT RESEARCH INSTITUTE AND MATHEW GREENWALD & ASSOCIATES INC., 2007 RETIREMENT CONFIDENCE SURVEY OF 1,000 PEOPLE AGE 25 AND UP. PERCENTAGES MAY NOT EQUAL 100 BECAUSE OF ROUNDING

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■ Q&A

Colleen Haviland

The director and founder of **Ready to Hire** explains how the online job board differentiates itself.

What is Ready to Hire's business model? Ready to Hire is similar to other online job boards, but we have gone a step further. At Ready to Hire, a prescreening process is implemented that ensures that every potential hire we offer to our clients is actually qualified for the positions they're looking to fill. To put it simply, job candidates in our database have to apply and be approved to even be listed with Ready to Hire.

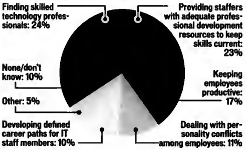
How rigorous is the qualification process? Ready to Hire acts as the first screening call that will capture tangible information to see a candidate's qualifications. Every candidate for our database must speak to one of our representatives before being included. If we can't capture 100% of the important candidate data that employers need to know, the candidate is not included in our database. And even after we first insert candidates into the database, Ready to Hire follows up with them every 45 days to ensure that information is kept current and accurate.

Are IT professionals willing to undergo this preliminary review? Yes. We currently have over 10,000 IT candidates across different disciplines, with hundreds more being added every day. And it's because they see the tremendous value in the service being offered that they are so eager to join.

– JAMIE ECKLE

What CIOs Want: Skills, Skills and Skills

CIOs were asked: **Of the following staffing issues within the IT department, which do you consider to be your greatest challenge as a CIO?**



SOURCE: ROBERT HALF TECHNOLOGY SURVEY OF MORE THAN 1,400 CIOs AT U.S. COMPANIES WITH AT LEAST 100 EMPLOYEES, FEBRUARY 2008

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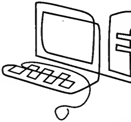

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SharkTank

TRUE TALES OF IT LIFE AS TOLD TO SHARKY

Dude, Where's My Van?

This IT shop uses a dull, brownish van to deliver new equipment to remote sites. "We finished one job early, and rather than go straight back to the office, we sat outside with a cup of coffee, and then we spotted a car wash," says a pilot fish there. "We decided to put the van into the car wash to pass a bit of time. We actually washed it four times, as it was a bit mucky." That's how they discover that the van isn't a brownish color – it's bright orange. But the next day, the fish is called into the boss's office because no one can find the van. "I went out and pointed to the van," fish says. "They didn't believe it was ours until they tried the keys. In the next five years, it was never washed again and reverted back to its natural dirty color."

But That Was Back Before Lunch

This sysadmin pilot fish is busy reimaging some laptops when the boss comes in with a question: "I got an e-mail from PayPal saying I sent money to this person, but I don't even know who this person is. There was a link in the e-mail to log into my account, so I tried to do that, but I can't get the page to come up. Can you fix it?" Incredulous fish gives boss a look. You know you're not supposed to click on links in e-mails, especially e-mails that are most likely spoofed, right? he says. "Yes," replies boss. And do you remember the security presentation that we both saw just this morning, where a user did exactly the same thing and wound up with an infected PC? "Yes," replies boss – who sheepishly walks away.

Unclear on The Concept

It's the mid-1970s, and this student pilot fish has a part-time job picking up and delivering punch cards for a computer service company. "One day, I picked up a set of cards from a customer who desired additional info to be put on their cards," fish says. "I examined the card; all columns on the card were in use. I explained that adding this info would require introducing another card into the mix. They responded by pointing out that there obviously was enough space between the holes and that by simply moving the holes closer together, we could certainly add at least two new holes to the card. I stuttered some muddled response and staggered on my way."

Should That Be Three Separate Tickets?

Support pilot fish receives a trouble ticket from a user with a straightforward request: "We need to open some very old files that were created in Lotus 1, 2 and 3."

■ *Sharky has a three-step plan for you: 1) Write down your true tale of IT life. 2) Send it to me at sharky@computerworld.com. 3) Receive a snazzy Shark shirt if I use it.*

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■ FRANKLY SPEAKING

Frank Hayes

See the Future

I CAN SEE THE FUTURE. You can too. Just look at the numbers released this month by the Computing Research Association. CRA's annual Taulbee Survey tracks the number of U.S. college students with computer science degrees. It also tracks the number of newly declared CS majors and college CS enrollments.

Surprise! Those graphs are identical — just shifted in time.

It's true. Check the data yourself at *www.cra.org/wp/index.php?p=139.* You'll see that the number of newly declared CS majors peaked in 2000, just before the dot-com bust. Undergrad CS enrollments peaked in 2002. CS bachelor's degrees peaked in 2004. Print out those three graphs and hold them up to the light, and they line up almost perfectly.

Four years after the dot-com bust in 2000, four-year CS degrees fell off a cliff. Gee, who'd have guessed *that* would happen?

And it turns out that four-year pattern has been consistent for decades — ever since PCs made an IT career look like a gold mine. Which means we really can see the future. Based on the number of freshman CS majors, we know that the number of CS graduates will drop for one more year, then flatten out after the class of 2009 to roughly the levels before the dot-com boom and bust.

So forget the gloom-and-doom headlines about plummeting interest in IT. No, kids haven't abandoned careers with us en masse. We've merely lost the huge influx of students who got dollar signs in their eyes when the Internet craze hit. In another year or so, we'll be back to normal — or, pre-dot-com normal.

(How predictable was all this? I wrote about it a year ago — and I was right. The future *must* be blazingly obvious.)

■ Four years after the dot-com bust, four-year CS degrees fell off a cliff. Gee, who'd have guessed *that* would happen?

But now that you can see the future, what are you going to do about it?

After all, it's a different IT world now than in the early 1990s. Today, IT permeates business in ways we could barely imagine back when Windows 3.1 was hot stuff. Our challenges range from e-commerce, packaged applications and software-as-a-service to security, training and integration for users who think they can do it all themselves.

We need more IT people with stronger and sharper IT skills than ever before. An IT worker pool at pre-dot-com levels won't be enough.

Then again, the skills we need aren't necessarily the ones that come attached to a CS degree.

We've replaced big legacy mainframe apps with ERP systems. We've got Web applications, mobile applications, customer-facing applications. Pre-dot-com *anything* won't cut it.

Yes, we'll need some people who can develop complex database schemas and architect well-engineered applications. But we'll need a lot more who can whip out mashups and glue code, chase after security threats and cross-network glitches, and handle any harebrained ideas users have for applying the newest gadgets to their jobs.

Now that you know we'll have a stable supply of well-schooled CS grads for the next few years, it's time to start thinking about how many you'll need in the next few years. They can be part of the plan for your staffing mix, along with outsourcing, power users and homegrown talent.

And by watching the CRA's annual numbers, you can get years of advance warning before the next CS-grad crunch.

What else in IT do we have that offers such predictability?

There are enough surprises in IT. This time, you can see the future. Take advantage of it. ■

Frank Hayes *is* Computerworld*'s senior news columnist. Contact him at frank_hayes@computerworld.com.*

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